Hopelessness and social support as predictors of physical status for breast cancer patients coping with recurrence.

A Senior Honors Thesis

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Abstract

Cancer recurrence typically brings a decline in physical functioning and feelings of hopelessness (HS). Social support (SS) may buffer the effects of hopelessness. The contribution of HS and SS and their interaction at the time of diagnosis to patients' later physical status was tested. METHOD: Patients diagnosed with breast cancer recurrence were assessed after diagnosis and at 4 and 10 month follow-ups. The outcome was a composite measure of physical status, including performance status, signs/symptoms of treatment toxicities, fatigue, and quality of life disruption due to physical symptoms. In addition to baseline physical status, predictors were HS and SS. RESULTS: Using hierarchical multiple regression, HS predicted poorer physical status at both 4- (β = -.34, p < .01) and 10-months (β = -.30, p < .05). Patients' marital status predicted physical status at 4- months (β = .19, p < .05) but not at 10-months. The interaction effect of HS and perceived social support from family predicted physical status at 4-months (β = -.22, p < .05). CONCLUSIONS: Hopelessness predicted subsequent poorer physical status months later. There was little evidence that this effect was lessened by concurrent social support.

Cancer recurrence typically brings difficult treatments, declining health from either progressive disease or the treatments (Oh et al., 2004), and the potential for a lowered quality of life. Cross sectional studies have found that women with breast cancer recurrence show significantly more physical symptoms after a recurrence diagnosis than before (Bull et al., 1999), and that recurrence patients show worse physical functioning than disease-free survivors or women currently in treatment for an initial diagnosis (Frost et al., 2000). In a controlled longitudinal study of women with breast cancer, physical status significantly declined between initial and recurrence diagnosis (Andersen, Shapiro, Farrar, Crespin, Wells-DiGregorio, 2005).

Along with declining physical functioning, breast cancer recurrence is also associated with psychological distress (Andersen et al., 2005; Mahon, Cella, & Donovan, 1990) including hopelessness (Koopman et al., 2001; Moore, Chamberlain, & Khuri, 2004; Noor-Mahomed, Schlebusch, & Bosch, 2003). Beck, Weissman, Lester, and Trexler define hopelessness as a person's negative expectancies for himself and for his future (1974). Farran, Herth, and Popovich further explain this construct by elaborating on the three components of hopelessness- affective, cognitive, and behavioral (1995). Affective hopelessness can be thought of as a general feeling of despair, cognitive as pessimistic thinking (ex. thinking "I'm not going to survive this illness"), and behavioral as actions influenced by affective and cognitive hopelessness (ex. giving up an active role in treatment because of the belief that one has no control over her future). Abramson, Metalsky, and Alloy go further to hypothesize that hopelessness is the cause of hopelessness depression (1989), which is a proposed subtype of depression.

Declining physical status may lead to increased hopelessness. This relationship has been found in breast cancer recurrence patients (Okano et al, 2001), those with other life threatening diseases (van Servellen, Sarna, Padilla, & Brecht, 1996), and among outpatients (Taniguchi,

Akechi, Suzuki, Mihara, & Uchitomi, 2003; Akechi, Okamura, Yamawaki, & Uchitomi, 1998). Increased hopelessness was significantly correlated with fatigue in ambulatory AIDS patients (Breitbart, McDonald, Rosenfeld, Monkman, & Passik 1998), and quality of life disruption due to physical symptoms in recurrent breast cancer patients (Northouse et al, 2002)

One mechanism thought to buffer the effects of hopelessness is social support (Abramson et al., 1989). Social support is associated with decreased psychological distress in recurrent cancer patients (Northouse, Laten, & Reddy, 1995; Parker, Baile, De Moor, & Cohen., 2003; Worden, 1989). However, a longitudinal study suggests that this effect may be short-lived- social support predicted psychological distress six months but not at 12-months for recurrent breast cancer patients in a study by Koopman, Hermanson, Diamond, Angell, & Spiegel (1998). In addition, more social support may be indirectly related to less hopelessness. A study found that among women with recurrent breast cancer, patients with more support reported less hopelessness and better mental and physical quality of life (Northouse et al., 2002). In summary, the literature suggests that recurrent patients experience declining physical functioning and hopelessness. Social support may act as a buffer, sheltering patients from distress.

Focus of the present investigation

While there is literature suggesting that decreased physical functioning leads to increased hopelessness, the converse relationship has not been tested. This investigation tests if feelings of hopelessness at the time of a breast cancer recurrence diagnosis predict worsened physical status four and ten months later. The study also investigated whether the presence of social support could predict better physical status. Lastly, the interaction of hopelessness and social support were tested.

Method

Procedure

Patients diagnosed with a breast cancer recurrence within the prior three months were eligible. Participants were recruited from a university-affiliated Comprehensive Cancer Center. Exclusion criteria were the following: prior/current refusal of treatment, prior diagnosis of other (non-breast) cancers, mental retardation, severe or untreated psychiatric disorders (e.g. schizophrenia, bipolar or borderline personality disorder), neurological or dementia disorders (e.g. Parkinson's), and/or autoimmune disorders (e.g. Lupus or Crohn's disease). Following the initial assessment patients were followed and reassessed 4 months, and 10 months later.

Of the 147 patients eligible, 112 (76%) participated in the study and completed the initial assessment. Of these, 75 (67%) completed the 4-month assessment and 70 (63%) completed the 10-month assessment. Between 4-months and 10-months, 17 (15%) people had a second recurrence or died, 17 (15%) dropped out of the study, and 8 (7%) were non-compliant. Women were given $50 for each completed assessment and parking reimbursement.

Participants

Of the 112 women who completed the assessment at baseline, on average, the participants had been disease free (calculated as the time between initial and recurrence diagnosis) for 51 months (*SD* = 47 months) and 68% had distant metastases. See Table 1 for disease treatment information of the sample and Table 2 for socio-demographic information.

Measures

Hopelessness. The Beck Hopelessness Scale (HS; Beck et al., 1974) measures a person's optimism or pessimism at present and for the future. It contains 20 items on a true-false scale. Examples of items include "I look forward to the future with hope and enthusiasm" and "My

future seems dark to me". Total scores can range from 0 to 20, with higher scores indicating more hopelessness. Hopelessness was measured at baseline. Its alpha reliability for this study's sample is .87.

Social Support. Four measures were used. (1) *Social Network Index.* (SNI; Berkman, 1977). The SNI has 10 items pertaining to the number of and degree of involvement with various social networks. In particular it concentrates on four social components- marital status, number of close friends and relatives and frequency of monthly contact with these individuals, church group membership, and membership in other groups. When the total score is calculated, intimate contacts are given more weighting than group membership. SNI scores range from 1 to 12, with a higher score indicating more social involvement. (2) *Partner status* (SO). Among other sociodemographic and personal information, participants were asked whether or not they were currently living with a romantic partner. Those with a partner were assigned the score of 1 and those without, 0. (3-4) *Perceived Social Support from Family and Friends.* (PSS-Fa & PSS-Fr; Procidano & Heller, 1983). These are 20-item measures assessing perceived support from family and friends. Total scores range from 0 to 20, with a higher score indicating more perceived social support. The alpha reliability for PSS-Fam for this study's sample is .93 and for PSS-Fr is .84.

Physical status. Four measures were used. (1) *Karnofsky Performance Scale.* (KPS; Karnofsky & Burchenal, 1949). This was used to measure performance status. The KPS ascertains a person's physical performance on an 11-point Likert- scale. KPS scores ranges from 100 (Normal, no complaints, no evidence of disease) to 0 (Dead) and has 10 point increments. A lower score indicates a lower ability to take care of oneself and perform daily activities. This measure was assessed by a research nurse. Across cancer studies, interrater reliability for the

scale ranges from .70 to .97 (Mor, Laliberte, Morris, & Wiemann, 1984; Yates, Chalmer, & McKegney, 1980). (2) *Fatigue Symptom Inventory.* (FSI; Hann et al, 1998). The FSI has a total of 14 items that measure the severity, frequency, and perceived interference of fatigue on quality of life. A Disruption Index is calculated by using 7 items that ask about the perceived interference of fatigue on daily activities (such as bathing, dressing, and working) and quality of life. Items in this dimension are measured on an 11-point Likert scale ranging from 0 (No interference) to 10 (Extreme Interference). For this study, the Disruption Index was calculated by finding the average of the ratings of these seven items. Total scores range from 0 to 10 with a higher score indicating greater fatigue interference. Its alpha reliability for this study's sample is 0.95. (3) *Southwest Oncology Group criteria.* (Sym/S; Moinpour et al., 1989). A research nurse recorded signs and symptoms of treatment toxicities using many of the criteria from the Southwest Oncology Group. The criteria look into toxicity symptoms in many body systems such as circulatory, cardiac, lung, neurological, etc, particularly as a result of chemotherapy treatment. Each symptom is rated for its severity, with a higher score indicating worse symptoms or toxicity. The possible scores for most items range from 0 to 4; however some items have a top score of 1, 2 or 3. For this study, the average score was found for each body system and then these were used to find a total average score. (4) *Medical Outcomes Study 36-Item Short Form.* (MOS-SF-36; Ware & Sherbourne, 1992). The MOS-SF-36 has 36 items relating to physical and mental quality of life. 8 subscales can be calculated from this measure, from the dimensions including physical functioning, role functioning related to physical health, bodily pain, general health perceptions, vitality, social functioning, role functioning related to emotional health, and mental health. Each of these subscales have scores from 0 to 100, with a higher score indicating a better quality of life. From these 8 subscales, 2 component summary scores can be calculated- a

Physical Component Summary (PCS) and a Metal Component Summary (MCS). For the purpose of this study, the PCS score was used. The PCS score is calculated by differentially weighing and aggregating subscale scores, giving positive weight to subscales that reflect physical quality of life and negative weight to mental. These aggregate scores are then standardized based on the general U.S. population of MOS-SF-36 scores.

Analytic Strategy

For primary analyses, a composite physical status variable of the four physical status measures was computed. First, scores from the FSI and Sym/S were reversed so that a higher score on all indices would indicate better physical status. Second, the scores were then standardized to have a mean of 0 and a standard deviation of 1. Finally, the composite physical status score was calculated by using the average of the four standardized scores. Bivariate correlations of physical status, socio-demographics, disease characteristic, and disease treatment variables are reported in Table 3. Variables that were significantly correlated with physical status were identified as control variables for hierarchical multiple regression analyses.

Hierarchical multiple regression was used. Physical status at the 4-month or 10-month time-point were the dependent variables and the predictors were entered in the following order- step 1- control variables (ie. employment status, presence of distant metastasis) step 2- physical status at baseline, step 3- hopelessness at baseline, step 4- social support at baseline step 5- the interaction of social support and hopelessness.

Follow up analyses were conducted to identify if there were any specific predictors out of the four measures used to measure physical status (KPS, Sym/S, FSI, PCS) that were contributing to any effects observed in the primary analyses. The same plan for variable entry was used as for the primary analyses

Results

Clinical description of the sample

At initial, total scores on the HS ranged from 0 to 19 with a mean score of 3 (*SD* = 4); 25% of the women scored at or above the cut-off score of 4 that indicates hopelessness. (Beck et al., 1974).

The average interference from fatigue in daily activities did not change significantly over the assessment period (Table 4), however the percentage of women who indicated that they experienced moderate to extreme fatigue disruption (a cutoff of 5) declined over the assessment period. At baseline, 24% reported moderate to extreme fatigue, 20% at 4-months, and 11% at 10-months. The average severity of signs and symptoms of treatment toxicities (Sym/S), and the nurse-assessed physical performance of the participants (KPS) did not change significantly over the assessment period (Table 4). The quality of life disruption due to physical symptoms (PCS) did not change significantly over the assessment period, however the means of this cancer sample are lower than that of the general US population (*Mean* = 50, *SD* = 10) and cancer patients in validation samples (*Mean* = 45.1, *SD* = 11.6).

Bivariate correlations (see Table 3) identified control variables for inclusion in the regression analyses. Socio-demographic, disease characteristic variables, and disease treatment variables that were significantly correlated with physical status were included in the analyses. This was done so that any observed contribution of hopelessness or social support was above and beyond the contributions of the control variables.

Multiple Regression Analyses

All models with the physical status at 4-months as the dependent variable were significant. In each, hopelessness was a significant predictor accounting for 53% of the total

variance (total adjusted R^2 = .51). Two of the social support and interaction variables were significant predictors (SO: β = .190, p = .033; PSS-Family X hopelessness: β = -.217, p = .033). The remaining social support and interaction variables were not significant predictors. (SNI and SNI X hopelessness: β = .068, p = .461 and β = .030, p = .796; PSS-Friends and PSS-Friends X hopelessness: β = -.682, p = .498 and β = -1.470, p = .146; PSS-Family: β = .048, p = .582; SO X hopelessness: β = -.001, p = .992) (see Table 5).

Follow-up analyses indicated that hopelessness significantly predicted FSI (β = .230, p = .036), KPS (β = -.292, p = .006), and Sym/S (β = .29, p=.003); see Table 7.

The interaction of PSS-Family was evaluated further by dichotomizing hopelessness and PSS-Fam, using the cutoff score of 4 to indicate hopelessness, as recommended by Beck et al. (1974) and the score of 18 to indicate less than ideal family support, based on the median of all of the PSS-Fam scores. The residualized change of physical status at 4-months was calculated and this was graphed with the dichotomized scores (Fig. 1). The interaction indicates that the women at greatest risk for worse physical status at 4-months were those who reported greater feelings of hopelessness at diagnosis *and* who perceived low levels of social support from their family.

All models with the physical status at 10-months as the dependent variable were significant. In each, hopelessness was a significant predictor accounting for 41% of the total variance (total adjusted R^2 = .39). None of the social support indices, nor their interactions with hopelessness, were significant predictors when added to the model (SNI: β = -.047, p = .654; SNI X hopelessness: β = -.116, p = .417; PSS-Fam: β = .057, p = .578; PSS-Fam X hopelessness: β = -.209, p = .082; PSS-Fr: β = .040, p = .707; PSS-Fr X hopelessness: β = -.235, p = .053; SO: β = .016, p = .876; SO X hopelessness: β = -.133, p = .295) (see Table 6).

Follow-up analyses indicated that hopelessness significantly predicted FSI (β = .344, p = .004), and PCS (β = -.224, p = .049); see Table 8.

Discussion

These results indicate that feelings of hopelessness in response to a diagnosis of breast cancer recurrence can be especially burdensome to a woman's physical status. In this study, hopelessness predicted subsequent poorer physical status months later. This effect was seen not only in patient-rated, but nurse-rated physical status measures as well, such as the Karnofsky Performance Scale and signs/symptoms of treatment toxicities. In particular, hopelessness significantly predicted fatigue up to 10 months after diagnosis, physical performance and symptoms of treatment toxicity 4 months after diagnosis, and physical quality of life 10 months after diagnosis.

The relation between fatigue and hopelessness upholds the findings of Breitbart et al.(1998) who found that hopelessness was significantly correlated with fatigue in a study of ambulatory AIDS patients. However, the relation between physical quality of life, as measured by the SF-36, and hopelessness contradicts the findings of Northouse et al. (2002) who found no such association between the two. On the other hand, although Northouse did not find this correlation, he did find through structural equation modeling that hopelessness moderates an effect between social support and physical quality of life. This is still contradictory to the results of this study, which found that social support did not significantly contribute to the regression model with physical quality of life as a predictor. One of the possible reasons for the difference in these studies is that Northouse's study looked at physical quality of life at baseline, whereas the current study looked at it at 4 and 10-months. It is possible that there is a ceiling effect of social support; social support at baseline is beneficial but later either the support has reached its

maximum usefulness, or the patient's support network is no longer providing as much support as it was initially.

This study had a number of strengths. Multiple measures of physical status were used, including two nurse-assessed measures. This increased the validity of the results, by combining data from an unbiased, skilled, rater with self-reported data. It also allowed us to look at multiple facets of physical status such as fatigue, physical performance, etc. Initial physical status was controlled in the study, thus ensuring that there was a true effect of hopelessness on future physical status, and the results were not because women with breast cancer recurrence often face a decline in physical functioning (Oh et al., 2004). Multiple measures of social support were also used, including both structural measures (e.g., presence of a significant other, numbers of family members and friends) and functional measures (e.g., patients' perceptions of support from others). The final strength of this study was that it was longitudinal. Most of the prior literature on hopelessness and physical status report on cross-sectional studies. Whereas prior literature suggested an association between hopelessness and physical status, this study tests hopelessness as a predictor of future physical status.

The major weakness to this study was that the study sample was not representative of the total population of women who have had a breast cancer recurrence in the US. Our sample consisted overwhelmingly of Caucasian women with an above-average income and a higher than average amount of education. This may limit the generalizability of these results to other races/ethnicities and socioeconomic groups. For example, African-American women have a higher mortality rate from breast cancer than Caucasian women, and are more likely to be diagnosed with larger tumors (American Cancer Society, 2005). Lower income women also have higher breast cancer mortality rates and are more likely to be diagnosed with more advanced

disease (Baquet & Commiskey, 2000; O'Malley, Le, Glaser, Shema & West, 2003; Miller, Hankey & Thomas, 2002). This may suggest that African-American women and women of a lower socioeconomic status with recurrent cancer, experience worse physical status in the months following diagnosis than their Caucasian and higher socioeconomic counterparts.

These findings have clinical implications. Women diagnosed with a breast cancer recurrence may experience less decline in physical status if their initial hopelessness can be decreased. The Beck Hopelessness Scale can be administered by a nurse in order to identify hopeless breast cancer recurrence patients who may benefit from an intervention.

Future studies could design an intervention to decrease hopelessness upon cancer recurrence diagnosis, and then test if a decrease in hopelessness has a positive effect on future physical status. One such intervention that has effectively been used is the Hope Intervention (HIP; Herth, 2001) The HIP instills hope in individuals with recurrence through establishing connectedness with others, identifying threats to hope, encouraging utilization of social support and community resources, reflecting on the meaning of life, and nurturing internal resources such as optimism. Future studies can also test to see if hopelessness can predict physical status for other cancer types, and if these patients' physical status may also benefit from interventions targeting hopelessness.

In conclusion, feelings of hopelessness upon breast cancer recurrence diagnosis are a significant predictor of future physical status, and social support does little to buffer this effect. Patients' physical status may benefit as a result of interventions targeted toward alleviating hopelessness.

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Table 1

Cancer treatments received during baseline and 4 and 10- month assessments

Time-point	In Treatment	Type			
		Surgery	Chemotherapy	Tamoxifen	Radiation
Baseline	84%	29%	44%	31%	22%
4-months	86%	3%	56%	39%	5%
10-months	83%	3%	41%	51%	6%

Table 2

Baseline socio-demographic characteristics of the sample (N=112).

Variable	Percent	Minimum	Maximum	Mean	Standard Deviation
Employed	46%	--	--	--	--
Have significant other	70%	--	--	--	--
Caucasian	92%	--	--	--	--
Age (Years)	--	30	89	59	11
Education (Years)	--	9	22	15	3
Annual household income (Thousands)	--	5	500	68	60

Table 3

Correlation matrix of all variables in study

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	Sociodemographics																												
1	Age (Yrs)																												
2	Ed	-.108																											
3	Employed[a]	-.271	-.091																										
4	Race[b]	.036	-.036	-.145																									
	Disease/Treatment																												
5	Stage[c]	-.126	.167	-.068	-.08																								
6	In Treatment[a]	-.127	.050	.127	.133	.043																							
7	DFI[d]	.282	-.042	-.087	**.203**	**-.201**	.002																						
8	Local mets[a]	.105	-.065	-.058	-.167	**-.333**	-.190	.032																					
9	Distant mets[a]	-.047	.055	.028	.137	**.293**	.250	-.048	**-.883**																				
	Physical status (at baseline)																												
10	Composite	-.110	-.034	**.199**	**-.213**	.028	.113	.038	.162	-.168																			
11	Sym/S	.247	-.021	-.134	.13	.15	-.128	.048	-.074	.045	**-.701**																		
12	KPS	-.144	.023	**.199**	-.167	-.013	.085	.068	.146	**-.198**	**.746**	**-.352**																	
13	FSI	-.078	.113	-.109	**.285**	-.036	-.086	-.049	-.151	.148	**-.816**	**.385**	**-.472**																
14	PCS	.072	-.04	.98	-.135	.078	-.002	.037	.154	-.153	**.803**	**-.371**	**.454**	**-.639**															
	Physical status (at 4-months)																												
15	Composite	.015	-.103	.243	-.135	-.024	-.024	-.057	.147	-.188	**.69**	**-.477**	**.489**	**-.540**	**.536**														
16	Sym/S	.018	.12	-.143	.167	-.003	-.117	-.041	-.067	.09	**-.610**	**.552**	**-.400**	**.496**	**-.344**	**-.778**													
17	KPS	-.055	-.075	**.268**	-.044	-.05	.078	-.09	.086	-.154	**.435**	**-.288**	**.409**	**-0.237**	**.348**	**.805**	**-.458**												
18	FSI	-0.04	.015	-.154	**.241**	-.015	.029	.004	-.066	.021	**-.646**	**.444**	**-.409**	**.594**	**-.488**	**-.835**	**.598**	**-.434**											
19	PCS	.019	-.134	.133	-.097	-.009	-.095	-195	**.28**	**-.359**	**.592**	**-.289**	**.448**	**-.386**	**.608**	**.834**	**-.454**	**.640**	**-.597**										
	Physical status (at 10-months)																												
20	Composite	-.035	.022	.16	-.151	-.066	.097	.058	.106	-.183	**0.596**	**-.453**	**-.461**	**-.534**	**.368**	**0.668**	**.483**	**.417**	**-.646**	**.642**									
21	Sym/S	.11	.048	-.087	.084	.026	-.263	.014	.005	.053	**-.568**	**.620**	**-.374**	**.400**	**-.330**	**-.57**	**.513**	**-.339**	**.476**	**-.474**	**-.802**								
22	KPS	-.077	.073	.193	-.224	.002	.056	.065	.229	**-.346**	**.532**	**-.316**	**.450**	**-.497**	**.378**	**.565**	**-.366**	**.352**	**-.588**	**.575**	**.848**	**-.618**							
23	FSI	-.093	-.024	-.097	.128	.131	-.096	-.205	-.038	.06	**-.425**	**.285**	**-.303**	**.503**	**-.247**	**-.488**	**.395**	-0.206	**.577**	**-.324**	**-.779**	**.488**	**-.507**						
24	PCS	-.042	.088	.111	-.1	-.084	-.077	-.066	.189	**-.240**	**.419**	**-.249**	**.328**	**-.365**	**.336**	**.539**	**-.265**	**.392**	**-.414**	**.710**	**.839**	**-.525**	**.653**	**-.564**					
	Predictors (at baseline)																												
25	Hopelessness	.032	-.034	-.011	-.041	.107	**-.234**	.08	-097	.078	**-.384**	**.273**	**-.250**	**.411**	**-.209**	**-.443**	**.389**	**-.338**	**.426**	**-.255**	**-.395**	**.318**	-.172	**.474**	**-.259**				
26	SNI	-.14	.157	.16	-.155	.046	.013	.006	.007	-.039	.169	-.124	0.074	**-.230**	0.129	**.32**	**-.291**	**.292**	-.112	.213	.155	-.092	.052	-.079	.142	**-.265**			
27	PSS-Family	.029	.067	.016	-.123	.087	-.051	.047	-.007	.047	.056	-0.007	0.1	-0.12	-.036	.049	0.026	0.075	-0.09	.033	.134	-0.045	-0.02	-0.198	.171	**-.264**	**.426**		
28	PSS-Friends	-.106	.096	-.001	.049	-.013	**.263**	.145	.052	-.03	.056	-.017	0.072	0.062	0.067	.023	.037	0.17	.045	.008	-.002	-.01	-.132	-0.1	.022	**-.315**	**.300**	**.391**	
29	SO Status[e]	-.297	.069	.148	**-.305**	-.028	-.016	**-.203**	.019	-.069	**.232**	-.119	**.226**	**-.225**	.156	**.387**	**-.310**	**.351**	-.188	**.306**	.2	-.151	.177	-.037	.198	-.178	**.567**	.164	.034

[a] 0=No, 1=Yes; [b] 1=Caucasian, 2=Minority; [c] 1=Stage I, 2=Stage II, 3=Stage III; [d] Disease Free Interval- Time between original and recurrence diagnosis (months); [e] 0=No Partner, 1=Partner; **Bold** = $p < .05$; Ed=Years of education; Local Mets= Local Metastasis; Distant Mets= Distant Metastasis; SYM/S = Southwest Oncology Group Criteria; KPS = Karnofsky Performance Status; FSI = Fatigue Symptom Index; PCS= Physical Component Score; SNI = Social Network Index; PSS = Perceived Social Support; SO = Significant Other

Table 4

Descriptive statistics for outcome variables across time

Measure	Time-Point	Minimum	Maximum	Mean	Standard Deviation
FSI	Baseline	0	9	3	2
	4-months	0	10	3	2
	10-months	0	9	2	2
Sym/S	Baseline	.05	.54	.27	.11
	4-months	.05	.75	.28	.14
	10-months	.06	.51	.25	.11
KPS	Baseline	40	100	77	11
	4-months	20	100	78	12
	10-months	40	100	79	12
PCS	Baseline	13	58	37	10
	4-months	17	65	39	12
	10-months	16	60	39	12

Table 5
Regression models with physical status at 4-months as the dependent variable

	Statistics by Step		Statistics by Predictor	
Step and Predictor	TR^2	R^2 Change	β	t
Outcome: Physical status at 4-months (Model 1)				
1. Employed at baseline[a]	.05	.05†	.13	1.44
2. Physical Status at baseline	.47	.42***	.56	5.92***
3. Hopelessness (HS)	.53	.06**	-.21	-1.68
4. SNI	.53	.00	.07	.74
5. Hopelessness X SNI	.53	.00	.03	.26
Outcome: Physical status at 4-months (Model 2)				
1. Employed at baseline[a]	.05	.05†	.19	2.20*
2. Physical Status at baseline	.47	.42***	.53	5.72***
3. Hopelessness (HS)	.53	.06**	-.37	-3.42***
4. PSS-Family	.53	.00	.05	.55
5. Hopelessness X PSS-Family	.56	.03*	-.22	-2.17**
Outcome: Physical status at 4-months (Model 3)				
1. Employed at baseline[a]	.05	.05†	.18	2.08*
2. Physical Status at baseline	.47	.42***	.53	5.81***
3. Hopelessness (HS)	.53	.06**	-.38	-3.45***
4. PSS-Friends	.54	.01	-.06	-.68
5. Hopelessness X PSS-Friends	.55	.01	-.16	-1.47
Outcome: Physical status at 4-months (Model 4)				
1. Employed at baseline[a]	.05	.05†	.11	1.25
2. Physical Status at baseline	.47	.42***	.52	5.74***
3. Hopelessness (HS)	.53	.06**	-.23	-2.38*
4. Significant Other Status (SO)	.56	.03*	.19	2.18*
5. Hopelessness X SO	.56	.00	.00	.00

[a] 0=No, 1=Yes; † p = .06, * p < .05, ** p < .01, *** p < .001

Table 6
Regression models with physical status at 10-months as the dependent variable

Step and Predictor	Statistics by Step		Statistics by Predictor	
	TR^2	R^2 Change	β	t
Outcome: Physical status at 10-months (Model 1)				
1. Physical Status at baseline	.26	.36***	.52	4.94***
2. Hopelessness (HS)	.41	.05*	-.34	-2.26*
3. SNI	.41	.00	-.05	-.45
4. Hopelessness X SNI	.42	.01	-.12	-.82
Outcome: Physical status at 10-months (Model 2)				
1. Physical Status at baseline	.26	.36***	.50	4.92***
2. Hopelessness (HS)	.41	.05*	-.34	-2.81**
3. PSS-Family	.41	.00	.06	.56
4. Hopelessness X PSS-Family	.44	.03	-.21	-1.77
Outcome: Physical status at 10-months (Model 3)				
1. Physical Status at baseline	.26	.36***	.50	5.00***
2. Hopelessness (HS)	.41	.05*	-.35	-3.02**
3. PSS-Friends	.41	.00	.04	.38
4. Hopelessness X PSS-Friends	.44	.03†	-.24	-1.97†
Outcome: Physical status at 10-months (Model 4)				
1. Physical Status at baseline	.26	.36***	.52	5.04***
2. Hopelessness (HS)	.41	.05*	-.32	-2.43*
3. Significant Other Status (SO)	.41	.00	.02	.16
4. Hopelessness X SO	.42	.01	-.13	-1.06

† $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7
Regression models for follow-up analyses with dependent at 4-months

	Statistics by Step		Statistics by Predictor	
Step and Predictor	TR^2	R^2 Change	β	t
Outcome: Fatigue Symptom Inventory (FSI) at 4-months				
1. FSI at baseline	.37	.37***	.51	4.74***
2. Hopelessness (HS)	.42	.04*	.23	2.15*
Outcome: Karnofsky Performance Scale (KPS) at 4-months				
1. Employed at baseline[a]	.06	.06*	.22	2.12*
2. KPS at baseline	.19	.13***	.30	2.84**
3. Hopelessness (HS)	.27	.08**	-.29	-2.80**
Outcome: Physical Component Score of SF-36 (PCS) at 4-months				
1. Local Metastasis [a]	.16	.16**	-.05	-.27
Distant Metastasis [a]			-.36	-1.83
2. PCS at baseline	.48	.31***	.54	5.85***
3. Hopelessness (HS)	.49	.02	-.13	-1.44
Outcome: Signs and Symptoms of Treatment Toxicities (Sym/S) at 4-months				
1. Sym/S at baseline	.30	.30***	.47	4.91***
2. Hopelessness (HS)	.38	.08**	.29	3.04**

[a] 0=No, 1=Yes; † $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 8
Regression models for follow-up analyses with dependent at 10-months

Step and Predictor	Statistics by Step		Statistics by Predictor	
	TR^2	R^2 Change	β	*t*
Outcome: Fatigue Symptom Inventory (FSI) at 10-months				
1. FSI at baseline	.25	.25***	.37	3.23**
2. Hopelessness (HS)	.35	.10**	.34	3.04**
Outcome: Karnofsky Performance Scale (KPS) at 10-months				
1. Distant Metastasis [a]	.11	.11**	-.25	-2.33**
2. KPS at baseline	.26	.15***	.38	3.48***
3. Hopelessness (HS)	.28	.02	-.13	-1.18
Outcome: Physical Component Score of SF-36 (PCS) at 10-months				
1. Distant Metastasis [a]	.06	.06*	-.19	-1.69
2. PCS at baseline	.16	.10**	.30	2.67*
3. Hopelessness (HS)	.21	.05*	-.22	-2.01*
Outcome: Signs and Symptoms of Treatment Toxicities (Sym/S) at 10-months				
1. Sym/S at baseline	.39	.39***	.58	5.82***
2. Hopelessness (HS)	.40	.01	.13	1.25

[a] 0=No, 1=Yes; † $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 1.

Interaction effect of Hopelessness and Perceived Social Support of Family (PSS-Fam) at baseline on Physical Status at 4-months.